

REMARKS

Reconsideration and allowance of the present application are respectfully requested. Claims 1-9 had been previously been canceled. By the foregoing amendment, claims 10, 18 and 26 have been canceled. Claims 14, 22 and 29 have been rewritten into independent form. All of the remaining claims depend from dependent claims 14, 22 and 29.

In numbered paragraph 4 on page 2 of the Office Action, claims 10-11 and 18-19, were rejected under 35 U.S.C. §103 as being unpatentable over newly cited U.S. Patent No. 6,181,826 (Weldy) in view of previously relied upon U.S. Patent No. 5,838,834 (Saito). In numbered paragraph 5 on page 4 of the Office Action, claims 12-17 and 20-32 were rejected under 35 U.S.C. §103(a) as being unpatentable over the Weldy and Saito patents in further combination with previously cited U.S. Patent No. 6,263,106 (Yamagata). Applicants' claims 14, 22 and 29, as rewritten into independent form, are considered allowable over the Weldy, Saito and Yamagata patents, regardless of whether these patents are considered individually or in the combination relied upon by the Examiner.

As described in the summary on page 2 of Applicant's specification, exemplary embodiments of the present invention provide for higher quality digital images in a digital camera system when fewer than the maximum number of images permitted by the size of a picture memory have been taken. Image compression is performed to produce a primary compressed data set and an auxiliary compressed data set. The primary compressed data set is sufficient to reproduce an image at a first quality level. The primary and auxiliary

data sets can be combined to reproduce the same image at a higher quality level. As images are captured, primary and auxiliary data sets are formed for each image and the primary data set is stored in the picture memory. If storage space is available, the auxiliary data set is also stored in the picture memory. When the picture memory becomes filled with primary and auxiliary data sets, the space containing auxiliary sets is reclaimed to store additional primary data sets. As such, exemplary embodiments of the present invention provide functional capabilities which add intelligence to the manner by which digital images are stored and/or removed from a picture memory.

The foregoing features are broadly encompassed by Applicant's independent claim 14. This claim is directed to a method for processing images in a digital camera wherein the digital camera includes an image storage device having primary and secondary storage areas. This method includes generating from a raw image, including employing a first quantizing step, a first compressed image data set suitable for reproducing substantially the entire image at a first quality level. The method also includes generating from the raw image, including employing a second quantizing step independent of the first quantizing step, a second compressed image data set which when combined with the first compressed image data set reproduces substantially the entire image at a second, higher quality level. In accordance with the claim 14 method, space in the secondary storage area of the image storage device is released if insufficient space is available in the primary storage area of the image storage device to store the first compressed image data set.

None of the patents to Weldy, Saito or Yamagata, even when considered in the combination relied upon by the Examiner, teach or suggest such a method.

The newly cited Weldy patent is directed to reconstructing an M level image by forming at least two non-dependent digital images from an original digital image and by determining a quantization level M of the original digital image and then forming the two non-dependent images by quantizing the original M level image to two M/2 level images, one being rounded down and the other being rounded up in value (see Abstract). The reconstructed image having a higher resolution than any of the non-dependent M/2 digital images is formed by combining and averaging at least two of the non-dependent images. Figure 1 of the Weldy patent describes the processing of digital images such that they can be written onto a compact disk by a CD writer 5. A CD player 7 is used to read user selected images from the compact disk under user control and to reconstruct and to forward the selected images for display on, for example, a standard TV display 8 or to cause a printing of the selected image by a printer, such as a thermal printer 9. In a variant, the CD player 7 may be a computer with a photo-CD reader incorporated therein and images on the compact disk may be read out for display on a computer monitor.

Column 3, lines 31-45 of the Weldy patent describe the receipt of a digitized image from a scanner 3 having high resolution which permits certain printers to print images that correspond to photographic quality originals. This portion of the Weldy specification describes that by manipulating the images through a hierarchical residual based scheme, a number of images of differing resolution levels can be generated and written on the compact disk. Portions of the specification referred to by the Examiner, such as column 7, lines 63-67, describe storing representations of images quantized using different quantizers for purposes of reconstructing the image for viewing or printing.

The Weldy patent is not directed to the efficient storage of image information generated using a first quantizing step and a second quantizing step independent of the first quantizing step, whereby space in a secondary storage area of an image storage device is released if insufficient space is available in a primary storage area of the image storage device to store the first compressed image data set. Because such features are broadly encompassed in independent claims 14, 22 and 29, these claims are allowable over the Weldy patent.

The Saito and Yamagata patents relied upon by the Examiner, fail to overcome the deficiencies of the Weldy patent. As such, independent claims 14, 22 and 29 are considered allowable over the Weldy, Saito and Yamagata patents even when considered in the combination relied upon by the Examiner.

The Saito patent is directed to an image processing apparatus and method which temporarily stores frequency-converted data to quantize the data. The Saito patent discloses a multi-stage quantization and coding based on quantization errors generated in the quantization. The Saito patent does not disclose or suggest a process employing a second quantizing step independent of a first quantizing step, as recited in Applicant's independent claims. Rather, this patent discloses generating compressed image data that includes multi-stage quantization, where each stage is dependent on the previous stage in a manner as illustrated in Figure 1 and as described at column 7, lines 4-20 of the Saito patent.

Because the Saito patent is directed to a single quantization procedure, there would have been no motivation or suggestion to combine the quantization process of the Weldy

patent with that of the Saito patent. Moreover, any combination of the features described in the Weldy and Saito patents in the manner suggested by the Examiner would not have resulted in releasing space to store images. The Saito patent fails to overcome the absence of teaching or suggestion in the Weldy patent to release space in a secondary storage area of an image storage device if insufficient space is available in a primary storage area of the image storage device to store a first compressed image data set, as recited in Applicant's independent claims.

The Yamagata patent is directed to an image data compression device wherein a number of image data files recorded by the image data compression device are stored in an IC in a memory card either uncompressed, in a low-compression format, or in a high-compression format (see Abstract). This patent was cited in the rejection of claims 14, 26 and 29, with the Examiner asserting that with respect to these claims:

The limitations are well known in the art as shown in Yamagata. In the same field of endeavor, Yamagata '106 teaches a digital camera having image data selectively compressed and stored in a recording medium (IC card M). Yamagata further teaches that compressed image data can be selectively deleted to increase total capacity of the memory card (col. 1, lines 35+). In light of the teaching from Yamagata, it would have been obvious to one of ordinary skill in the art to modify the image processing apparatus taught in Weldy and Saito by allowing compressed image data to be selectively released so as increasing the total remaining capacity of the compressed data memory.

As described in the summary portion of the Yamagata patent, an object of this patent is to provide an image data compression device which enables a user of a still video camera to select image data that is inhibited from being compressed. This patent describes using data flags associated with image data files, where the data flags are set at the time of

recording. The compression of a recorded image data file is inhibited if an associated flag has a predetermined status. Image data files which are already recorded in the recording medium can be compressed to a next higher level of compression to increase remaining capacity, as described in the summary portion of this patent.

There would have been no motivation or suggestion to have used a quantization technique as described in the Weldy patent with the features described in the Yamagata patent. Moreover, even if the Weldy, Saito and Yamagata patents would have been combined in a manner suggested by the Examiner, the presently claimed invention would not have resulted.

The Yamagata patent does not teach or suggest releasing space in a secondary storage area of an image storage device if insufficient space is available in a primary storage area of the image storage device to store a first compressed image data set, as recited in Applicants' independent claim 14. Rather, the Yamagata patent is merely directed to increasing space by increasing the order of compression of image data files in a common memory area. Yamagata does not teach or suggest primary and secondary storage areas, nor does Yamagata teach or suggest releasing space in any such secondary storage area.

Independent claim 14 is therefore considered allowable over the Weldy, Saito and Yamagata patents, considered individually or in the manner relied upon by the Examiner.

In addition, independent claims 26 and 29, which recite similar features, are also considered allowable over these patents. The remaining pending claims depend from these three independent claims and are further considered allowable.

All rejections and objections raised in the Office Action having been addressed, it is respectfully submitted that the present application is in condition for allowance, and a Notice of Allowance is respectfully solicited.

Respectfully submitted,

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